09/787671

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

To: Hon. Commissioner of Patents
       Washington, D.C. 20231

00909

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: P 279233   /2980385US/VK/KP
                        M#   /Client Ref.

From: Pillsbury Winthrop LLP, IP Group: Date: March 21, 2001

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

1. International Application	2. International Filing Date	3. Earliest Priority Date Claimed
PCT/FI99/00771	20 September 1999	21 September 1998
⇧ country code	Day MONTH Year	Day MONTH Year
		(use item 2 if no earlier priority)

4.   Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

   (a) ☐ 20 months from above item 3 date   (b) ☒ 30 months from above item 3 date,

   (c) Therefore, the due date (unextendable) is   March 21, 2001

5.   Title of Invention IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORK

6.   Inventor(s)   HURTTA, Tuija

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

7.   ☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).

8.   ☐ **A copy of the International Application** as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:

   a. ☐ Request;
   b. ☐ Abstract;
   c. ___ pgs. Spec. and Claims;
   d. ___ sheet(s) Drawing which are ☐ informal ☐ formal of size ☐ A4 ☐ 11"

9.   ☒ **A copy of the International Application has been transmitted by the International Bureau.**

10.   **A translation of the International Application** into English (35 U.S.C. 371(c)(2))
   a.   ☒   is transmitted herewith including: (1) ☒ Request; (2) ☒ Abstract;
           (3) 10   pgs. Spec. and Claims;
           (4) 1   sheet(s) Drawing which are:
                        ☐ informal ☒ formal of size ☒ A4 ☐ 11"
   b.   ☐   is not required, as the application was filed in English.
   c.   ☐   is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements
           Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
   d.   ☐   Translation verification attached (not required now).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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(a) ☐ 20 months from above item 3 date (b) ☒ 30 months from above item 3 date,

(c) Therefore, the due date (unextendable) is March 21, 2001

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6. Inventor(s) HURTTA, Tuija

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    a. ☐ Request;
    b. ☐ Abstract;
    c. ___ pgs. Spec. and Claims;
    d. ___ sheet(s) Drawing which are ☐ informal ☐ formal of size ☐ A4 ☐ 11"

9. ☒ **A copy of the International Application has been transmitted by the International Bureau.**

10. **A translation of the International Application** into English (35 U.S.C. 371(c)(2))

    a. ☒ is transmitted herewith including: (1) ☒ Request; (2) ☒ Abstract;
        (3) 10 pgs. Spec. and Claims;
        (4) 1 sheet(s) Drawing which are:
        ☐ informal ☒ formal of size ☒ A4 ☐ 11"
    b. ☐ is not required, as the application was filed in English.
    c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
    d. ☐ Translation verification attached (not required now).

RE: USA National Filing of PCT _/FI99/00771_   JCO2 Rec'd PCT/PTO   2 1 MAR 2001

09/787671

11. ☒ **PLEASE AMEND** the specification before its first line by inserting as a separate paragraph:

a. ☒ --This application is the national phase of international application PCT/FI99/00771
filed _____September 20, 1999_____ which designated the U.S.--

b. ☐ --This application also claims the benefit of U.S. Provisional Application No.
60/___, filed ___ .--

12. ☐ Amendments to the claims of the International Application **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:**

13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau

14. ☐ Translation of the amendments to the claims **under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of claim amendments** made before 18th month, **is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).**

15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
a. ☐ is submitted herewith ☐ Original ☐ Facsimile/Copy
b. ☒ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.

16. **An International Search Report (ISR):**
a. Was prepared by ☐ European Patent Office ☐ Japanese Patent Office ☒ Other
b. ☒ has been transmitted by the international Bureau to PTO.
c. [X] copy herewith (_2_ pg(s).) [X]plus Annex of family members (_1_ pg(s).).

17. **International Preliminary Examination Report (IPER):**
a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
b. ☒ copy herewith **in English.**
c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
c.2 ☐ Specification/claim pages #___ claims #
Dwg Sheets #
d. ☐ Translation of Annex(es) to IPER **(required by 30th month due date, or else annexed amendments will be considered canceled).**

18. **Information Disclosure Statement** including:
a. ☒ Attached Form PTO-1449 listing documents
b. ☒ Attached copies of documents listed on Form PTO-1449
c. ☒ A concise explanation of relevance of ISR references is given in the ISR.

19. ☐ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.

20. ☐ Copy of Power to IA agent.

21. ☐ **Drawings** (complete only if 8d or 10a(4) not completed): __ sheet(s) per set: ☐ 1 set informal; ☐
Formal of size ☐ A4 ☐ 11"

22. Small Entity Status ∅ ☒ is **Not** claimed ☐ is claimed **(pre-filing confirmation required)**
22(a) ___ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)

23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) FINLAND of:

	Application No.	Filing Date		Application No.	Filing Date
(1)	982028	Sept. 21, 1998	(2)		
(3)			(4)		
(5)			(6)		

a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
b. ☐ Copy of Form PCT/IB/304 attached.

RE: USA National Filing of PCT/FI99/00771

JC02 Rec'd PCT/PTO   2 1 MAR 2001

24. Attached: Copy of Finnish OA

25. **Preliminary Amendment:**   Claim 3, line 1, delete " or 2 "
Claim 4, line 1, change "any one of claims 1 to 3 " to - - claim 1 - -
Claim 9, line 1, delete " or 8 "

25.5 Per Item 17.c2, **cancel original** pages #___, claims #___, Drawing Sheets #

26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**
Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☒ 25, ☐ 25.5 (hilite)

Total Effective Claims	minus 20 =	x $18/$9 =	$0	966/967
Independent Claims	minus 3 =	x $80/$40 =	$0	964/965
If any proper (ignore improper) Multiple Dependent claim is present,		add$270/$135	+0	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): ➔➔ BASIC FEE REQUIRED, **NOW** ➔➔➔➔ ↓

A. If country code letters in item 1 are **not** "US","BR","BB","TT","MX","IL" "NZ", "IN" or "ZA"   ↓

See item 16 re: ↓
1. Search Report was not prepared by EPO or JPO - - - - - - - - -   add$1000/$500   960/961
2. Search Report was prepared by EPO or JPO - - - - - - - - - - - -   add$860/$430   +1000   970/971

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US","BR","BB","TT","IL", "NZ", "IN" or "ZA"   ↓

➔ ☐ B. If USPTO did not issue both International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER), -   add$970/$485   +0   960/961

(X)
(only)

(one) ➔ ☐ C. If USPTO issued ISR but not IPER (or box 4(a) above is X'd), -   add$710/$355   +0   958/959

(of
these)

(4) ➔ ☐ D. If USPTO issued IPER but IPER Sec. V boxes not all 3 YES, -   add$690/$345   +0   956/957

(boxes)

➔ ☐ E. If international preliminary examination fee was paid to USPTO and Rules 492(a)(4) and 496(b) satisfied (IPER Sec. V all 3 boxes YES for all claims), - - - - - - - - - - - -   add $100/$50   +0   962/963

27.   **SUBTOTAL =** $1000

28. If Assignment box 19 above is X'd, add Assignment Recording fee of ----$40   +0   (581)

29. Attached is a check to cover the -   **TOTAL FEES** $1000

Our Deposit Account No. 03-3975
Our Order No.   60258 | 279233
                C# | M#

00909

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.
This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filed

Pillsbury Winthrop LLP
Intellectual Property Group

By Atty: Christine H. McCarthy   Reg. No.   41844

Sig: Fax: (202) 822-0944
Atty/Sec: CHM/mhn   Tel: (202) 861-3075
       NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

Document9   PAT-112CN 10/00

APPLICATION UNDER UNITED STATES PATENT LAWS

Atty. Dkt. No.   PW 279233/2980385US/VK/KP
                         (M#)

Invention: IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORK

Inventor (s):   HURTTA, Tuija

Pillsbury Winthrop LLP
Intellectual Property Group
1100 New York Avenue, NW
Ninth Floor
Washington, DC 20005-3918
Attorneys
Telephone: (202) 861-3000

This is a:

☐ Provisional Application

☐ Regular Utility Application

☐ Continuing Application
   ☒ The contents of the parent are incorporated
   by reference

☒ PCT National Phase Application

☐ Design Application

☐ Reissue Application

☐ Plant Application

☐ Substitute Specification
Sub. Spec Filed _____
    in App. No. _____/_____

☐ Marked up Specification re
Sub. Spec. filed _____
    In App. No _____/_____

SPECIFICATION

IN THE UNITES STATES PATENT AND TRADEMARK OFFICE

#4/
/B

In re PATENT APPLICATION OF   Confirmation No.: Not Yet Assigned

HURTTA   Group Art Unit: Not Yet Assigned

Appln. No.: 09/787,671   Examiner: Not Yet Assigned

Filed: March 21, 2001

Title: IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORK

April 16, 2001
* * * * *

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
Washington, D.C. 20231

Sir:

Kindly preliminary amend the above-referenced application as follows:

IN THE CLAIMS:

Please enter the following amended claims 1-11:

1. (Amended) A method for providing Internet Protocol-type mobility for at least one mobile station in a packet radio network including at least one support node configured to act as a gateway support node configured to interface with at least one external network, the gateway support node being configured to support at least an Internet Protocol-type protocol, the method comprising:

integrating, into the at least one gateway support node, a home agent configured to route data packets at least one of to and from the at least one mobile station;

supplementing the Internet Protocol-type protocol with an extension for mobility management of the at least one mobile station.

2. (Amended) The method of claim 1, wherein the at least one gateway support node includes a protocol stack configured to support at least a layer one protocol, a layer two protocol, and a network layer protocol, the Internet Protocol-type protocol residing on the network layer, and the extension for mobility management is a Mobile IP protocol.

3. (Amended) The method of claim 2, further comprising:

routing Internet Protocol data packets at least one of to and from the integrated home agent and gateway support node using only the network layer protocol and the layer two and layer one protocols.

4. (Amended) The method of claim 1, wherein the packet radio network further comprises a foreign agent and a serving support node configured to support mobility management of the at least one mobile station.

5. (Amended) The method of claim 4, further comprising integrating the foreign agent into at least one serving support node.

6. (Amended) The method of claim 4, further comprising integrating the foreign agent into the at least one gateway support node.

7. (Amended) A packet radio network for providing mobility service to at least one mobile station, the packet radio network comprising:

at least one support node configured to act as a gateway support node configured to interface with at least one external network, the gateway support node configured to support at least an Internet Protocol-type protocol; and

a home agent configured to route data packets at least one of to and from the at least one mobile station, the home agent being integrated with the gateway support node;

wherein the Internet Protocol-type protocol includes or is associated with an extension for mobility management of the at least one mobile station.

8. (Amended) The packet radio network of claim 7, further comprising:

at least one support node configured to act as a serving support node configured to support mobility management of the at least one mobile station; and

a foreign agent integrated into one of the at least one support nodes.

9. (Amended) The packet radio network of claim 8, wherein the foreign agent is integrated into the at least one serving support node.

10. (Amended) A gateway support node for a packet radio network configured to provide mobility service for at least one mobile station, wherein:

the gateway support node is configured to be interoperable with at least one serving support node to route data packets at least one of to and from the at least one mobile station;

the gateway support node is configured to support at least an Internet Protocol-type protocol that includes or is associated with an extension for mobility management of the at least one mobile station; and

the gateway support node is configured to provide functions of the gateway support node and a home agent configured to route data packets at least one of to and from the at least one mobile station.

11. (Amended) A method of using a gateway support node as a home agent that provides mobility service for at least one mobile station in a packet radio network, the method comprising:

supporting at least an Internet Protocol-type protocol that includes or is associated with an extension for mobility management of the at least one mobile station, wherein supporting is performed by the gateway support node.

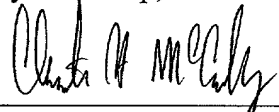See the attached Appendix for the changes made to effect the above claims.

REMARKS

Claims 1-11 are pending. By this preliminary amendment, claims 1-11 have been amended to merely clarify the recited subject matter. Claims 1, 7, 10 and 11 are independent claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

Early and favorable action on the merits are respectfully requested.

Respectfully submitted,

Pillsbury Winthrop, LLP

By:_____
Christine H. McCarthy
Reg. No. 41,844
Tel. No.: (202) 861-3075
Fax No.: (202) 822-0944

CHM

1100 New York Avenue, N.W.
Ninth Floor - East Tower
Washington, DC 20005-3918
(202) 861-3000
Enclosure: Appendix

APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claims 1-11 as follows:

1. (Amended) A method for providing Internet Protocol-type[, or IP-type,] mobility for [a] at least one mobile station [(MS)] in a packet radio network [comprising:] including at least one support node [(GGSN, SGSN);] configured to act as [at least one support node being] a gateway support node [(GGSN) for interfacing] configured to interface with at least one external network [networks (11)], [said] the gateway support node [supporting] being configured to support at least an [IP-type] Internet Protocol-type protocol, the method comprising:[; c h a r a c t e r i z e d by]

integrating, into [said] the at least one gateway support node [(GGSN)], a home agent [(HA) for routing] configured to route data packets at least one of to and from the [to/from said] at least one mobile station;

supplementing [said IP-type] the Internet Protocol-type protocol with an extension for mobility management of [said] the at least one mobile station.

2. (Amended) [A] The method [according to] of claim 1, [c h a r a c t e r i z e d in that said] wherein the at least one gateway support node [comprises] includes a protocol stack [(18, 20) for supporting] configured to support at least a layer one [1 (L1)] protocol, a layer two [2 (L2)] protocol, and a network layer [(L3)] protocol, [and that said IP-type] the Internet Protocol-type protocol [resides] residing on [said] the network layer [(L3);], and [said] the extension for mobility management is [substantially] a Mobile IP protocol.

3. (Amended) [A] The method [according to] of claim [1] 2,
[c h a r a c t e r i z e d by] further comprising:

routing [IP] Internet Protocol data packets at least one of to and from
[to/from said] the integrated home [agent/gateway] agent and gateway support node
[(GGSN+HA)] using only the network layer [(L3)] protocol and the layer two[2] and
layer [1] one protocols.

4. (Amended) [A] The method of claim 1 , [c h a r a c t e r i z e d in that]
wherein the packet radio network further comprises a foreign agent [(FA)] and a
serving support node [(SGSN), known per se, for supporting] configured to support
mobility management of the at least one mobile station [(MS); and that the foreign
agent (FA) is integrated into at least one support node (SGSN, GGSN)].

5. (Amended) [A] The method [according to] of claim 4,
[c h a r a c t e r i z e d by] further comprising integrating the foreign agent [(FA)] into
at least one serving support node [(SGSN)].

6. (Amended) [A] The method [according to] of claim 4,
[c h a r a c t e r i z e d by] further comprising integrating the foreign agent [(FA)] into
the at least one gateway support node [(GGSN)].

7. (Amended) A packet radio network for providing mobility service to [a] at
least one mobile station [(MS)], the packet radio network comprising:

at least one support node [(GGSN, SGSN) wherein at least one support

node is] configured to act as a gateway support node [(GGSN) for interfacing]

configured to interface with at least one external [networks (11)] network, [said] the

gateway support node [supporting] configured to support at least [IP-type] an Internet

Protocol-type protocol; and

[the packet radio network being c h a r a c t e r i z e d by an integrated

network element (GGSN+HA) comprising the functions of the gateway support node

(GGSN) and] a home agent [(HA) for routing] configured to route data packets

[to/from] at least one of to and from the at least one mobile station, the home agent

being integrated with the gateway support node;

wherein [said IP-type] the Internet Protocol-type protocol [comprises]

includes or is associated with an extension for mobility management of [said] the at

least one mobile station.

8. (Amended) [A] The packet radio network [according to]of claim 7,

[c h a r a c t e r i z e d in that the packet radio network comprises] further

comprising:

[a foreign agent (FA) and] at least one support node configured to act as a

serving support node [(SGSN), known per se, for supporting] configured to support

mobility management of the at least one mobile station [(MS)]; and

[that the] a foreign agent [(FA) is] integrated into one of the at least one

support nodes[node (SGSN, GGSN)].

9. (Amended) [A] The packet radio network [according to] of claim [7] 8, [c h a r a c t e r i z e d   in that] wherein the foreign agent [(FA)] is integrated into the at least one serving support node [(SGSN)].

10. (Amended) A gateway support node [(GGSN+HA)] for a packet radio network[, arranged] configured to provide mobility service for [a] at least one mobile station [(MS)], wherein:

the gateway support node [(GGSN+HA)] is configured to be interoperable with at least one serving support node [(SGSN), for routing] to route data packets [to/from] at least one of to and from the at least one mobile station [(MS)];

the gateway support node is configured to support [supports] at least [IP-type] an Internet Protocol-type protocol that includes or is associated with an extension for mobility management of the at least one mobile station; and

the gateway support node is configured to provide [being c h a r a c t e r i z e d by comprising the] functions of the gateway support node [(GGSN)] and a home agent [(HA) for routing] configured to route data packets at least one of to and from the at least one[to/from the] mobile station[;

wherein said IP-type protocol comprises or is associated with an extension for mobility management of said mobile station].

11. (Amended) A method of using [Use of] a gateway support node [(GGSN)] as a home agent [(HA) for providing] that provides mobility service for at least one [a] mobile station [(MS)] in a packet radio network, the method comprising:

9

[wherein the gateway support node supports] <u>supporting</u> at least an [IP-type] <u>Internet Protocol-type</u> protocol[, and said IP-type protocol comprises] <u>that includes</u> or is associated with an extension for mobility management of [said] <u>the at least one</u> mobile station, <u>wherein supporting is performed by the gateway support node.</u>

IP mobility mechanism for a packet radio network

Background of the invention

The invention relates to a mechanism for providing IP (Internet Protocol) mobility in a packet radio network such as GPRS or UMTS. IP mobil-
5   ity is the topic of standard RFC2002 by the Internet Engineering Task Force (IETF). This RFC standard is incorporated herein by reference. In short, IP mobility is a mechanism for providing a mobile user with telecommunications capability using an IP address. It enables mobile nodes to change their points of attachment in the Internet without changing their IP address. Thus it facili-
10   tates the communication of a mobile node and a correspondent node with the mobile node's home address. Fig. 1 illustrates the concept of an IP mobility mechanism in a packet radio network.

Within the context of this application, a 'Network Access Server (NAS)' is a device providing users with temporary, on-demand network ac-
15   cess. This access is point-to-point using telephone, ISDN or cellular connections, etc. A 'Mobile Node (MN)' refers to a host that wishes to use a Home Network address while physically connected by a point-to-point link (phone line, ISDN, etc.) to a NAS that does not reside on the Home Network. A 'Correspondent node' is a peer node with which a mobile node is communi-
20   cating. The correspondent node may be either mobile or stationary. A 'Mobile Station (MS)' is a mobile node having a radio interface to the network. A 'Tunnel' is the path followed by a datagram when encapsulated. The model of a tunnel is such that, while encapsulated, a datagram is routed to a known de-capsulation agent, which decapsulates the datagram and then correctly deliv-
25   ers it to its ultimate destination. Each mobile node connecting to a home agent does so over a unique tunnel, identified by a tunnel identifier which is unique to a given Foreign Agent/Home Agent pair.

The MS can be a laptop computer PC connected to a packet radio-enabled cellular telephone. Alternatively, the MS can be an integrated
30   combination of a small computer and a packet radio telephone, similar in appearance to the Nokia Communicator 9000 series. Yet further embodiments of the MS are various pagers, remote-control, surveillance and/or data-acquisition devices, etc.

The Radio Access Network RAN can be a part of a GPRS system
35   or a third generation (3G) system, such as UMTS. The RAN comprises an air interface Um which is a performance bottleneck. SGSN and GGSN are GPRS

terms for access and gateway support nodes, respectively. In so-called third generation (3G) systems, the SGSN nodes are sometimes referred to as 3G-SGSN nodes. Subscriber information is stored permanently in the Home Location Register HLR.

5   A 'Home Network' is the address space of the network to which a user logically belongs. When a workstation is physically connected to a LAN, the LAN address space is the user's home network. A 'Home Address' is an address that is assigned to a mobile node for an extended period of time. It may remain unchanged regardless of where the MN is attached to the Inter-
10   net. Alternatively, it could be assigned from a pool of addresses. A 'Home Agent' is a routing entity in a mobile node's home network which tunnels packets for delivery to the mobile node when it is away from home, and maintains current location information for the mobile node. It tunnels datagrams for delivery to, and detunnels datagrams from, a mobile node when the mobile node
15   is away from home.

        A 'Foreign Agent' refers to a routing entity on a mobile node's visited network which provides routing services to the mobile node while registered, thus allowing a mobile node to utilise its home network address. The foreign agent detunnels and delivers packets to the mobile node that were
20   tunnelled by the mobile node's home agent. For datagrams sent by a mobile node, the foreign agent may serve as a default router for registered mobile nodes.

        RFC2002 defines 'Care-of-Address' (COA) as the termination point of a tunnel toward a mobile node, for datagrams forwarded to the mobile node
25   while it is away from home. The protocol can use two different types of care-of-address: a "foreign agent care-of-address" is an address of a foreign agent with which the mobile node is registered, and a "co-located care-of-address" is an externally obtained local address which the mobile node has associated with one of its own network interfaces. Within the context of this application,
30   the 'Care-of Address' (COA) is an address of a foreign agent with which the mobile node is registered. An MN may have several COAs at the same time. A primary COA is the address which the MN sends to its HA when registering. The list of COAs is updated when advertisements are received by the mobile node. If an advertisement expires, its entry or entries should be deleted from
35   the list. One foreign agent can provide more than one COA in its advertisements. 'Mobility Binding' is the association of a Home Address with a Foreign

Agent IP address and a Tunnel ID. An MN registers its COA with its HA by sending a Registration Request. The HA replies with a Registration Reply and retains a binding for the MN.

5   In basic versions of Mobile IP, all datagrams destined to an MN are routed via the MN's home network and home agent HA. This process is called triangle routing. It may increase the load of the network and the HA may be a performance bottleneck. So-called route optimization protocol extensions for Mobile IP aim to eliminate the problems associated with triangle routing. In route optimization, correspondent nodes and previous FAs may retain an up-

10   to-date binding for the MN in their binding caches. As a result, the correspondent nodes may tunnel their datagrams directly to the MN's COA and previous FAs may forward datagrams destined to the MN to the MN's current COA. The binding may be retained after reception of a Binding Update. If requested, a node should acknowledge the reception by sending a Binding Acknowledge.

15   These messages must be authenticated. They are typically carried by User Datagram Protocol (UDP).

       Routing data packets to an MN is a problem in a packet radio network, such as the GPRS. This is because the data network address of the MN typically has a static routing mechanism, whereas a MN can roam from one

20   subnetwork to another. One approach for data packet routing in a mobile environment is the concept of Mobile IP. Mobile IP enables the routing of IP datagrams to mobile hosts, independent of the point of attachment in the subnetwork.

       The standard Mobile IP concept does not fit exactly into the GPRS

25   environment because network protocols other than IP must be supported, too. The GPRS infrastructure comprises support nodes such as a GPRS gateway support node (GGSN) and a GPRS serving support node (SGSN). The main functions of the GGSN nodes involve interaction with the external data network. The GGSN updates the location directory using routing information sup-

30   plied by the SGSNs about an MS's path and routes the external data network protocol packet encapsulated over the GPRS backbone to the SGSN currently serving the MS. It also decapsulates and forwards external data network packets to the appropriate data network and handles the billing of data traffic.

       The main functions of the SGSN are to detect new GPRS mobile

35   stations in its service area, handle the process of registering the new MSs

along with the GPRS registers, send/receive data packets to/from the GPRS MS, and keep a record of the location of the MSs inside of its service area. The subscription information is stored in a GPRS register where the mapping between a mobile's identity (such as MS-ISDN or IMSI) and the PSPDN ad-

5   dress is stored. The HLR acts as a database from which the SGSNs can ask whether a new MS in its area is allowed to join the GPRS network.

The GPRS gateway support nodes GGSN connect an operator's GPRS network to external systems, such as other operators' GPRS systems, data networks 11, such as an IP network (Internet) or an X.25 network, and

10   service centres. Fixed hosts 14 can be connected to the data network 11 e.g. by means of a local area network LAN and a router 15. A border gateway BG provides access to an inter-operator GPRS backbone network 12. The GGSN may also be connected directly to a private corporate network or a host. The GGSN includes GPRS subscribers' PDP addresses and routing information,

15   i.e. SGSN addresses. Routing information is used for tunnelling protocol data units PDU from the data network 11 to the current switching point of the MS, i.e. to the serving SGSN. The functionalities of the SGSN and GGSN can be connected to the same physical node.

The home location register HLR of the GSM network contains

20   GPRS subscriber data and routing information and it maps the subscriber's IMSI into one or more pairs of PDP type and PDP address. The HLR also maps each PDP type and PDP address pair into a GGSN node. The SGSN has a Gr interface to the HLR (a direct signalling connection or via an internal backbone network 13). The HLR of a roaming MS and its serving SGSN may

25   be in different mobile communication networks.

The intra-operator backbone network 13, which interconnects an operator's SGSN and GGSN equipment can be implemented, for example by means of a local network, such as an IP network. It should be noted that an operator's GPRS network can also be implemented without the intra-operator

30   backbone network, e.g. by providing all features in one computer.

A GPRS network in its current form is able to support IP mobility if a MS implements the Mobile IP protocol and if it has a private IP address assigned by some company or Internet service provider (ISP). When a GGSN node assigns a temporary IP address to the MS, the MS can use this tempo-

35   rary address as its care-of-address (COA) and register the address with its home agent, thus benefiting from the Mobile IP services. This is also true

when the MS is using a predefined GGSN IP address, which can also be re-
garded as a COA. The only entity that can prevent the MS from using the
GGSN-assigned IP address as its COA is a foreign agent (FA) whose agent
advertisement messages are received by the MS and which require the MS to
5　register with that particular FA.

A problem of the known IP mobility mechanisms is poor integration
with packet radio systems. In other words, the known IP mobility mechanisms
are designed, at least primarily, for wired access systems. This is turn has the
side effect that each datagram is processed though a large number of different
10　protocol layers, which involves a large processing overhead. Also, equipping
each datagram with a large number of protocol headers wastes the capacity of
the network.

Disclosure of the invention

An object of the invention is to improve the integration between IP
15　mobility mechanisms and packet radio systems. In other words, the invention
should solve, or at least minimize, the problems associated with the prior art IP
mobility mechanisms. The object is achieved with a method and equipment
which are characterized by what is disclosed in the attached independent
claims. Preferred embodiments of the invention are disclosed in the attached
20　dependent claims.

The invention is based on the vision that a home agent HA is in-
stalled at the edge of the packet radio network. Such a location allows the HA
to decide whether to route datagrams addressed to a mobile subscriber using
GPRS/GTP or Internet/IP. Preferably, the HA is integrated or consolidated into
25　a gateway support node of a packet radio network. In a GPRS network, suit-
able gateway support nodes are the GGSN nodes. Each connection has two
PDP contexts in the GGSN. One context corresponds to the fixed IP address
stored in the subscribers home-GGSN, and the other corresponds to a dy-
namic address stored in the visited GGSN. In terms of mobility management
30　(MM), the invention enables the use of two coexisting MM contexts, a GPRS
MM context and a Mobile IP context. The integration of the home agent to the
subscriber's home GGSN decides which MM context should be used for rout-
ing a datagram.

A further advantage of the invention is that Mobile IP support be-
35　comes a service provided by the network operator. Thus the operator can also
charge the users for this service.

According to a preferred embodiment of the invention, the protocol stack used for routing data packets (i.e. datagrams) at the integrated gateway node/home agent is streamlined by routing data packets directly using network layer (i.e. layer 3) protocols. This embodiment results in increased throughput and/or lighter overhead due to a smaller protocol stack at the integrated gateway node/home agent, when routing IP datagrams.

According to another preferred embodiment of the invention, foreign agents FA are installed in SGSN nodes. Such placement of foreign agents maximizes the benefits of the invention, since it maximizes the span of the network that can be covered with the smaller protocol stack. (Currently, the IP tunnel ends at the SGSN. If the IP tunnel is extended into the Radio Access Network RAN, then, preferably, the foreign agents FA should also be moved to the RAN. In such a case, a possible network element could be the BSC/RNC.)

Alternatively, the FAs can be installed at the GGSN but then a GTP tunnel is required for routing IP packets between the GGSN and the SGSN. As a yet further alternative, the FAs can be omitted altogether, if IPv6 and a technique known as address autoconfiguration is used.

Brief description of the drawings

The invention will be described in more detail by means of preferred embodiments with reference to the appended drawing on which:

Fig. 1 illustrates an IP mobility mechanism comprising a known home agent HA and routing of datagrams at the HA; and

Fig. 2 illustrates an IP mobility mechanism comprising a home agent HA according to the invention and routing of datagrams at the HA.

Detailed description of the invention

Fig. 1 is block diagram illustrating an IP mobility mechanism comprising a home agent HA located in the internal backbone network 13. (Such a location is shown only as an example.) Reference numeral 18 in the lower-left hand corner of Fig. 1 denotes a protocol stack at such a prior art HA. The double-headed arrow illustrates routing of IP datagrams at the GGSN. Correspondingly, reference numeral 19 denotes a datagram comprising a payload portion PL and a number of headers H, one header for each of the protocols needed for routing the datagram. It is apparent that processing each datagram though a large number of protocol layers involves a large processing over-

head. Also, equipping each datagram with a large number of protocol headers wastes network capacity.

Fig. 2 illustrates an IP mobility mechanism comprising a home agent HA according to the invention, whereby the home agent HA is integrated
5   into a GGSN node, commonly referred to as a gateway node. Reference numeral 20 denotes a protocol stack at the HA according to the invention. Correspondingly, reference numeral 21 denotes a datagram according to the invention. The datagram comprises a payload portion PL and one header H for each of the protocols needed for routing the datagram. It is apparent that the
10 invention saves processing overhead and increases the throughput by decreasing the number of headers required in the datagrams.

If IPv4 is used, the HA intercepts datagrams addressed to the mobile station MS, encapsulates them and sends them to the MS's COA. The COA may be provided by a foreign agent FA, or it may be acquired by the MS
15 itself using a technique such as the DHCP (Dynamic Host Configuration Protocol).

In known IP mobility mechanisms, foreign agents FA are typically installed as software routines in the mobile nodes MN. Fig. 1 shows an embodiment wherein foreign agents FA are installed in every SGSN node. (Such
20 FA placement is the subject matter of Reference 1.) Each FA has an IP address in the Internet and in the operator's own private GPRS/3G network. For each SGSN/FA, a permanent packet data context exists in the corresponding gateway node GGSN to enable tunnelling towards the FA. One of the link protocols between an MS and the SGSN (e.g. Layer 3 Mobility Management,
25 L3-MM) is modified to support IP mobility.

According to an alternative embodiment shown in reference 1, the foreign agent FA is integrated into a gateway node GGSN. In this case the MS uses as its COA the address of the FA in the gateway node. In order to establish mobility binding, the MS has to send additional information to the SGSN.
30 Because of this additional information, the selected gateway node knows that a received IP address is valid although it does not belong to this particular gateway node. The gateway node detects registration messages from the MS and sends them to its FA unit for processing. This can be implemented easily if the gateway node's router unit sends all packets with a time-to-live field of
35 zero to the FA. The advantage of this feature is that the gateway node does not have to study incoming packets in any great detail which would require

large amounts of processing power. Moreover, the gateway node GGSN/PDAN can accept any IP address from the MS and use the address of the FA as the MS's COA.

As a yet further alternative, the FAs can be dispensed with alto-
5   gether, if IPv6 and a technique known as address autoconfiguration is used. The mobility support in IPv6 combines the concepts of Mobile IP and route optimization. Each time the MN moves its point of attachment from one IP sub-network to another, it needs a COA from the current subnetwork. The MN may configure the COA by stateful or stateless autoconfiguration. (Stateful auto-
10   configuration relies on an address configuration server; in stateless autoconfiguration the MN picks an address and tries to find out if this address is already in use.)

The MN may send Binding Update messages, or 'options' to its correspondent nodes to let them dynamically learn and cache the MN's binding.
15   Using the binding, the correspondent nodes may send their packets directly to the MN's COA. ('Option' is a term used in connection with IPv6 for certain optional headers inserted after the IPv6 header. Similarly, with IPv6, the word 'packet' is generally used for datagrams.) The Binding Update/Acknowledge Options are carried as IPv6 Destination Options and they may be included in
20   any IPv6 packet. Destination Options are examined only by the packet's destination node, whereby the load of the intervening routers is not increased.

When sending a packet, a Correspondent Node checks its binding cache for an entry for the packet's destination address. If an entry is found, the Correspondent Node routes the packet directly to the MN's COA. An IPv6
25   Routing Header is used instead of IPv6 encapsulation. The Routing Header includes the MN's Home Address. If no entry is found, the Correspondent Node sends the packet normally to the MN's Home Network, wherein the HA intercepts the packet and tunnels it to the MN's COA using IPv6 encapsulation.

30   The description only illustrates preferred embodiments of the invention. The invention is not, however, limited to these examples or the terms used, but it may vary within the scope of the appended claims.

Reference

1. Finnish patent application [agent's reference 2980379FI], as-
35   signed and titled similarly and filed on the same day as the present application.

Claims

1. A method for providing Internet Protocol-type, or IP-type, mobility for a mobile station (MS) in packet radio network comprising:

at least one support node (GGSN, SGSN);

5   at least one support node being a gateway support node (GGSN) for interfacing with external networks (11), said gateway node supporting at least an IP-type protocol;

c h a r a c t e r i z e d by

integrating, into said at least one gateway support node (GGSN), a
10   home agent (HA) for routing data packets to/from said mobile station;

supplementing said IP-type protocol with an extension for mobility management of said mobile station.

2. A method according to claim 1, c h a r a c t e r i z e d in that said gateway node comprises a protocol stack (18, 20) for supporting at least a
15   layer 1 (L1) protocol, a layer 2 (L2) protocol, and a network layer (L3) protocol, and that said IP-type protocol resides on said network layer (L3); and said extension for mobility management is substantially a Mobile IP protocol.

3. A method according to claim 1 or 2, c h a r a c t e r i z e d by routing IP data packets to/from said integrated home agent/gateway node
20   (GGSN+HA) using only the network layer (L3) protocol and the layer 2 and layer 1 protocols.

4. A method according to any one of claims 1 to 3, c h a r a c t e - r i z e d in that the packet radio network comprises a foreign agent (FA) and a serving support node (SGSN), known per se, for supporting mobility manage-
25   ment of the mobile station (MS); and that the foreign agent (FA) is integrated into at least one support node (SGSN, GGSN).

5. A method according to claim 4, c h a r a c t e r i z e d by integrating the foreign agent (FA) into at least one serving support node (SGSN).

6. A method according to claim 4, c h a r a c t e r i z e d by integrat-
30   ing the foreign agent (FA) into at least one gateway support node (GGSN).

7. A packet radio network for providing mobility service to a mobile station (MS), the packet radio network comprising at least one support node

(GGSN, SGSN) wherein at least one support node is a gateway support node (GGSN) for interfacing with external networks (11), said gateway node supporting at least IP-type protocol;

5   the packet radio network being c h a r a c t e r i z e d by an integrated network element (GGSN+HA) comprising the functions of the gateway support node (GGSN) and a home agent (HA) for routing data packets to/from the mobile station;

wherein said IP-type protocol comprises or is associated with an extension for mobility management of said mobile station.

10   8. A packet radio network according to claim 7, c h a r a c t e r i - z e d in that the packet radio network comprises a foreign agent (FA) and a serving support node (SGSN), known per se, for supporting mobility management of the mobile station (MS); and that

the foreign agent (FA) is integrated into at least one support node
15 (SGSN, GGSN).

9. A packet radio network according to claim 7 or 8, c h a r a c t e - r i z e d in that the foreign agent (FA) is integrated into at least one serving support node (SGSN).

10. A gateway support node (GGSN+HA) for a packet radio net-
20 work, arranged to provide mobility service for a mobile station (MS), wherein the gateway support node (GGSN+HA):

is interoperable with at least one serving support node (SGSN), for routing data packets to/from the mobile station (MS);

supports at least IP-type protocol;
25   the gateway support node being c h a r a c t e r i z e d by comprising the functions of the gateway support node (GGSN) and a home agent (HA) for routing data packets to/from the mobile station;

wherein said IP-type protocol comprises or is associated with an extension for mobility management of said mobile station.

30   11. Use of a gateway support node (GGSN) as a home agent (HA) for providing mobility service for a mobile station (MS) in a packet radio network, wherein the gateway support node supports at least an IP-type protocol, and said IP-type protocol comprises or is associated with an extension for mobility management of said mobile station.

Fig. 1

MS (MN)

Um   HPLMN   VPLMN

BS

BSC/RNC   BSC/RNC   BS

RAN

SGSN   SGSN

12

Inter-oper.
backbone

BG   BG

FA   FA

HA

HLR   Intra-oper.   11   Intra-oper.
backbone   backbone

13   13

Data
network

GGSN   GGSN

15

Router   LAN   Host

14

IP/X.25
GTP
UDP/TCP
L3 (IP)
L2
L1

18

GGSN

H   19

L1	L2	IP	UDP/TCP	GTP	PL

Fig. 2

20   BSC/RNC   SGSN

IP/X.25
GTP
UDP/TCP
L3 (IP&Mobile IP)
L2
L1

GGSN+HA

FA   12

HLR   13

HA   11

13

GGSN+HA

15

H   21

L1	L2	IP	PL

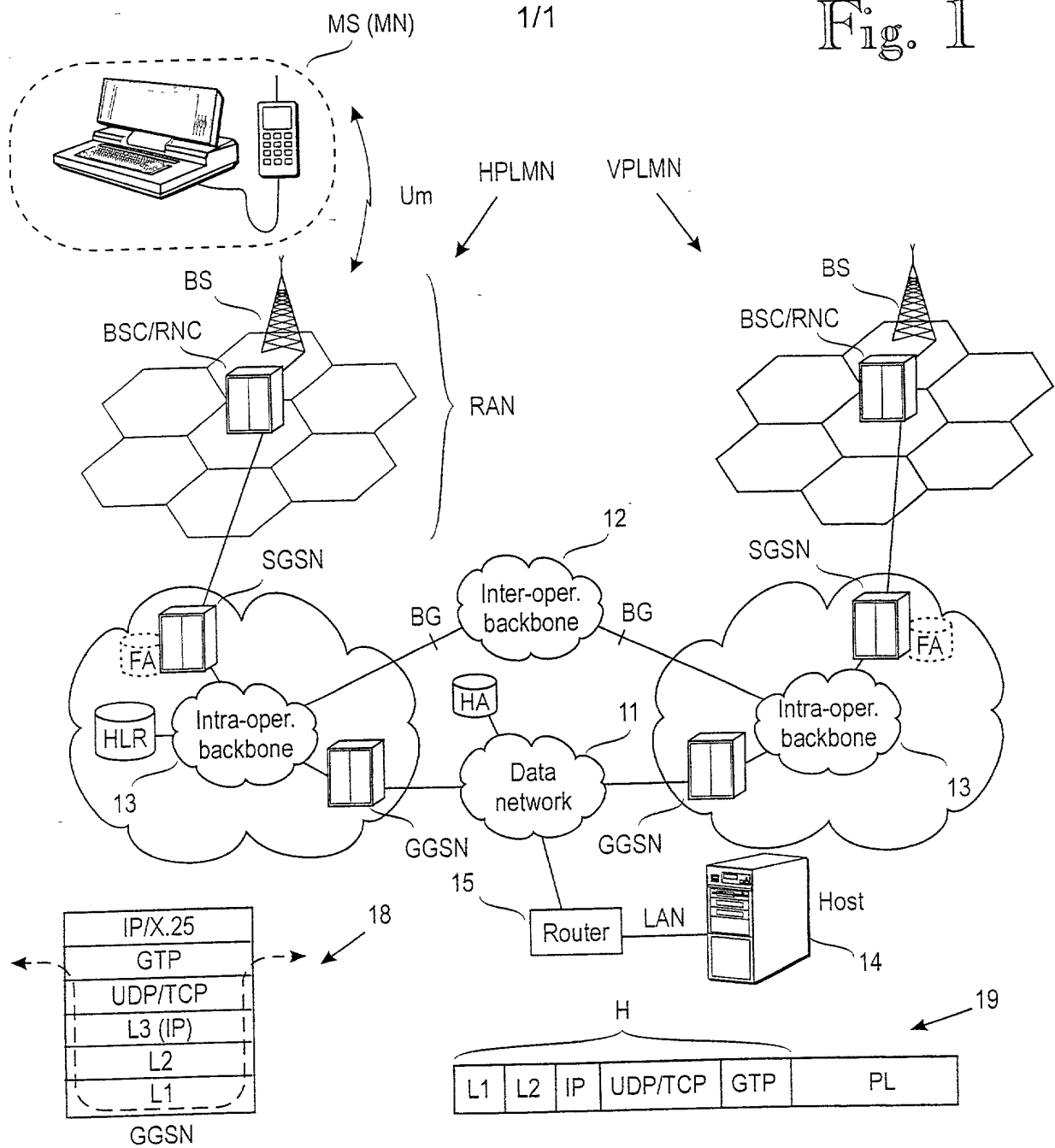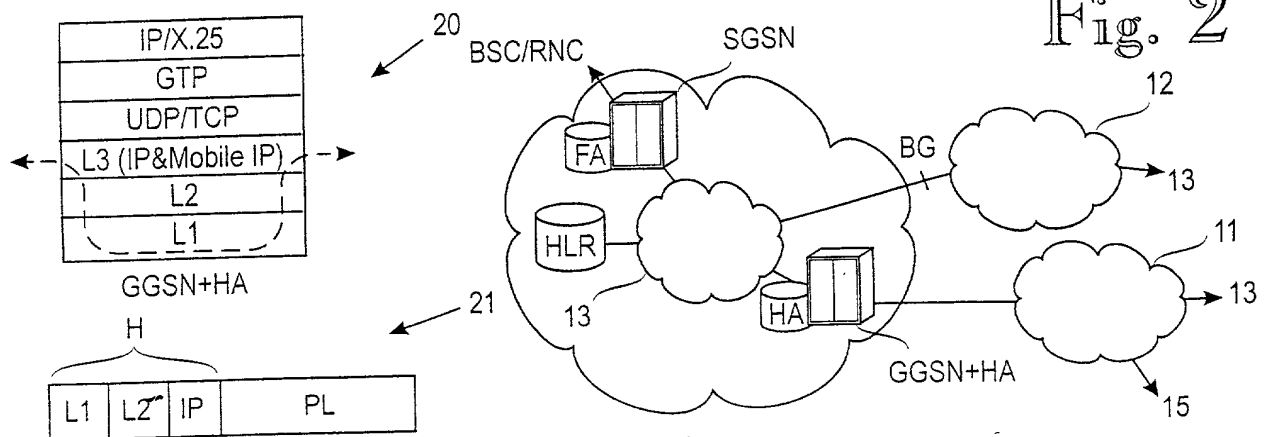# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION

Inventor(s): HURTTA

Appln. No.: 09 | 787,671

Series Code ↑ | Serial No. ↑

Filed: March 21, 2001

Hon. Commissioner of Patents
Washington, D.C. 20231

Sir:

OIPE
APR 1 6 2001
PATENT & TRADEMARK OFFICE

Group Art Unit: Unknown
Examiner: Unknown

Atty. Dkt. P 279233 | 2980385US/VK/KP

M# | Client Ref

Appln. Title: IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORKA

JC04 Rec'd PCT/PTO 1 6 APR 2001

Date: April 16, 2001

REPLY/AMENDMENT/LETTER

This is a reply/amendment/letter in the above-identified application and includes the herewith attachment of same date and subject which is incorporated hereinto by reference and the signature below is treated as the signature to the attachment in absence of a signature thereto.

FEE REQUIREMENTS FOR CLAIMS AS AMENDED

1. Small Entity claim

A. ☒ NOT made
B. ☐ Withdrawn
C. ☐ made herewith
D. ☐ made previously

For B & C
See **Required Separate** Paper (Pat-256)

	Claims remaining after amendment	Highest number previously paid for	Present Extra	Large/Small Entity	Additional Fee	Fee Code Lg/Sm
2. Total Effective Claims		**minus 20	0	x $18/$9 =	+ $0	103/203
3. Independent Claims		***minus 3	0	x $80/$40 =	+ $0	102/202
4. If amendment enters proper multiple dependent claim(s) into this application for first time (leave blank if this is a reissue application)........add				+ $270/$135 =	+ $0	104/204
5. Original due Date:		☒ NONE				115/215
6. Petition is hereby made to extend the original due date to cover the date this response is filed for which the requisite fee is attached	(1 mo) $110/$55 = (2 mos) $390/$195 = (3 mos) $890/$445 = (Usable only for ≤ 2mo.OA - - - 4 mos) $1390/$695= (Usable only for 30 day/1mo.OA - - - 5 mos) $1890/$945=			+ $0		116/216 117/217 118/218 128/228
7. Enter any previous extension fee paid since above original due date and subtract				- $0		
8.			**Extension Fee Attached**	+ $0		
9. If **Terminal Disclaimer** attached, add Rule 20(d) official fee				+ $110/$55	+ $0	148/248
10. If IDS attached requires Official Fee under Rule 97 (c), ...add or if Rule 97(d) Request ....add				+ $180 + $180	+ $0	126 126
11. After-Final Request Fee per rules 129(a) and 17(r)				+ $710/355	+ $0	146/246
12. No. of additional inventions for examination per Rule 129(b)				x $710/355 ea	+ $0	149/249
13. Request for Continued Examination (RCE)				+ $710/355	+ $0	1179/1279
14. Petition fee for					+ $0	
15.			**TOTAL FEE ENCLOSED =**	$0		

16. *If the entry in this space is less than entry in next space, the "Present Extra" result is "0".
17. **If the "Highest number previously paid for" in this space is less than 20, write "20" in this space.
18. ***If the "Highest number previously paid for" in this space is less than 3, write "3" in this space.

Our Deposit Account No. 03-3975)
(Our Order No. 60258 | 279233

C# | M#

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above, for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal sheet is filed.

Query: Is appeal deadline now? If so, file Notice of Appeals separately.

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NOTE: File this cover sheet in duplicate with PTO receipt (PAT-103A) and attachments

Document10

PAT-120 12/00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE   PATENT APPLICATION

Inventor(s): HURTTA

Appln. No.: 09 | 787,671
Series Code ↑ | Serial No. ↗

Filed: March 21, 2001

Hon. Commissioner of Patents
Washington, D.C. 20231

Sir:

Group Art Unit: Unknown
Examiner: Unknown
Atty. Dkt. P 279233 | 2980385US/VK/KP
M# | Client Ref

Appln. Title: IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORKA

Rec'd PCT/PTO 16 APR 2001

(Stamp: OIPE APR 16 2001 JC177 PATENT & TRADEMARK OFFICE)

REPLY/AMENDMENT/LETTER   Date: April 16, 2001

This is a reply/amendment/letter in the above-identified application and includes the herewith attachment of same date and subject which is incorporated hereinto by reference and the signature below is treated as the signature to the attachment in absence of a signature thereto.

FEE REQUIREMENTS FOR CLAIMS AS AMENDED

1. Small Entity claim
A. ☒ NOT made
B. ☐ Withdrawn
C. ☐ made herewith
D. ☐ made previously

For B & C
See **Required Separate** Paper
(Pat-256)

	Claims remaining after amendment	Highest number previously paid for	Present Extra	Large/Small Entity	Additional Fee	Fee Code Lg/Sm
2. Total Effective Claims		**minus 20	0	x $18/$9 =	+ $0	103/203
3. Independent Claims		***minus 3	0	x $80/$40 =	+ $0	102/202
4. If amendment enters proper multiple dependent claim(s) into this application for first time (leave blank if this is a reissue application)..............add				+ $270/$135 =	+ $0	104/204
5. Original due Date:		☒ NONE				
6. Petition is hereby made to extend the original due date to cover the date this response is filed for which the requisite fee is attached	(1 mo)	$110/$55 =		+ $0		115/215 116/216 117/217 118/218 128/228
	(2 mos)	$390/$195 =				
	(3 mos)	$890/$445 =				
(Usable only for ≤ 2mo.OA - - - 4 mos)		$1390/$695 =				
(Usable only for 30 day/1mo.OA - - - 5 mos)		$1890/$945 =				
7. Enter any previous extension fee paid since above original due date and subtract			- $0			
8.			**Extension Fee Attached**		+ $0	
9. If **Terminal Disclaimer** attached, add Rule 20(d) official fee				+ $110/$55	+ $0	148/248
10. If IDS attached requires Official Fee under Rule 97 (c), ...add or if Rule 97(d) Request ....add				+ $180 + $180	+ $0	126 126
11. After-Final Request Fee per rules 129(a) and 17(r)				+ $710/355	+ $0	146/246
12. No. of additional inventions for examination per Rule 129(b).......................				x $710/355 ea	+ $0	149/249
13. Request for Continued Examination (RCE)				+ $710/355	+ $0	1179/1279
14. Petition fee for					+ $0	
15.				**TOTAL FEE ENCLOSED =**	$0	

16. *If the entry in this space is less than entry in next space, the "Present Extra" result is "0".
17. **If the "Highest number previously paid for" in this space is less than 20, write "20" in this space.
18. ***If the "Highest number previously paid for" in this space is less than 3, write "3" in this space.

Our Deposit Account No. 03-3975)
(Our Order No. 60258 | 279233
C# | M#

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficiencies only) now or hereafter relative to this application and the resulting Official Document under Rule 20, or credit any overpayment, to our Accounting/Order Nos. shown above, for which purpose a duplicate copy of this sheet is attached.
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Query: Is appeal deadline now? If so, file Notice of Appeals separately.

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NOTE: File this cover sheet in duplicate with PTO receipt (PAT-103A) and attachments

Document10   PAT-120 12/00

FOR UTILITY/DESIGN
CIP/PCT NATIONAL/PLAN●
ORIGINAL/SUBSTITUTE/SUPPLEMENTAL
DECLARATIONS

RULE 63 (37 C.F●.63)
DECLARATION AND POWER OF ATTORNEY
FOR PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PM & S
FORM

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the **INVENTION ENTITLED** _____

IP MOBILITY MECHANISM FOR A PACKET RADIO NETWORK

the specification of which (CHECK applicable BOX(ES))

X   A. ☐ is attached hereto.
BOX(ES) B. ☐ was filed on _____ as U.S. Application No. __/_____
➔   C. X was filed as PCT International Application No. PCT /FI99 /00771 on 20 September 1999

and (if applicable to U.S. or PCT application) was amended on _____

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. Except as noted below, I hereby claim foreign priority benefits under 35 U S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one other country than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International Application, filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application:

PRIOR FOREIGN APPLICATION(S)			Date first Laid-	Date Patented	
Number	Country	Day/MONTH/Year Filed	open or Published	or Granted	Priority NOT Claimed
982028	Finland	21 September 1998			

If more prior foreign applications, X box *at bottom* and continue on attached page.

Except as noted below, I hereby claim domestic priority benefit under 35 U S C. 119(e) or 120 and/or 365(c) of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application.

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)		Status	Priority NOT Claimed
Application No. (series code/serial no.)	Day/MONTH/Year Filed	pending, abandoned, patented	

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Pillsbury Winthrop LLP, Intellectual Property Group, 1100 New York Avenue, N W , Ninth Floor, East Tower, Washington, D C 20005-3918, telephone number (202) 861-3000 (to whom all communications are to be directed), and the below-named persons (of the same address) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete names/numbers below of persons no longer with their firm and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and/or a below attorney in writing to the contrary.

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"X" box ☐ FOR ADDITIONAL INVENTORS, and proceed on the attached page to list each additional inventor.
☐ See additional foreign priorities on attached page (incorporated herein by reference).

Atty. Dkt. No. __PM__

(a) ...Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the [Patent and Trademark] Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability...(b) information is material to patentability when it is not cumulative and (1) It also establishes by itself, or in combination with other information, a prima facie case of unpatentability of a claim or (2) refutes, or is inconsistent with, a position the applicant takes in: (i) Opposing an argument of unpatentability relied on by the Office, or (ii) Asserting an argument of patentability

PATENT LAWS 35 U.S.C.

§102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless--

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months* before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

§103. Condition for patentability; non-obvious subject matter

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. . . .

(c) Subject matter developed by another person, which qualified as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

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* Six months for Design Applications (35 U.S.C. 172).